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Atropina (sistémica): información sobre el medicamento

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Divulgaciones de los colaboradores

Para obtener información adicional, consulte "Atropina (sistémica): información sobre el medicamento para el paciente" y "Atropina (sistémica): información sobre el medicamento para uso pediátrico".

Para ver abreviaturas, símbolos y definiciones de grupos de edad, consulte la tabla.

Marcas comerciales: EE. UU.

Atropen [DSC]

Categoría farmacológica

Agente anticolinérgico; Antídoto; Agente antiespasmódico gastrointestinal

Posología: Adultos

Nota: Las dosis intravenosas <0,5 mg se han asociado con bradicardia paradójica (Ref). Limite la dosis total a 0,03 a 0,04 mg/kg en pacientes con cardiopatía isquémica.

Collapse All

Bradicardia durante la reversión del bloqueo neuromuscular

Bradicardia durante la reversión del bloqueo neuromuscular: IV: 5 a 7 mcg/kg cuando se administra con edrofonio o 15 a 20 mcg/kg cuando se administra con neostigmina (Ref).

Bradicardia sintomática

Bradicardia sintomática:

Nota: La atropina es ineficaz en los receptores de trasplantes de corazón debido a la falta de inervación vagal y probablemente no sea efectiva para el bloqueo del nodo auriculoventricular de segundo grado o tercer grado tipo II (Ref).

IV, IM: 0,5 a 1 mg cada 3 a 5 minutos; se prefiere 1 mg para bradiarritmias graves (p. ej., hipotensión/shock, estado mental alterado, insuficiencia cardíaca aguda); dosis total máxima: 3 mg (Ref).

SHOUT
SHARE
IT

Endotraqueal: 1 a 2 mg cada 3 a 5 minutos.

Inhibe la salivación y las secreciones.

Inhibir la salivación y las secreciones (preanestesia): IM, IV, SUBQ: 0,5 a 1 mg 30 a 60 minutos antes del procedimiento; repetir cada 4 a 6 horas según sea necesario; dosis total máxima: 3 mg.

Intoxicación por hongos que contienen muscarina

Intoxicación por hongos que contienen muscarina (dosis fuera de etiqueta): IV: 1 a 2 mg; titular y repetir según sea necesario para revertir los síntomas (es decir, titular para lograr una disminución de las secreciones bronquiales) (Ref).

Intoxicación por insecticidas organofosforados o carbamatos o agentes nerviosos

Intoxicación por insecticidas organofosforados o carbamatos o agentes nerviosos:

Nota: La dosis de atropina necesaria varía considerablemente según la gravedad del envenenamiento. La cantidad total de atropina utilizada en caso de envenenamiento por carbamatos suele ser menor que en caso de envenenamiento por insecticidas organofosforados o agentes nerviosos. Los pacientes gravemente envenenados pueden mostrar una tolerancia significativa a la atropina; pueden necesitarse ≥2 veces las dosis sugeridas. Ajustar la dosis según el estado pulmonar (disminución de las secreciones bronquiales); considerar la administración de atropina mediante infusión intravenosa continua en pacientes que requieran grandes dosis de atropina (Ref). Una vez que el paciente se encuentre estable durante un período de tiempo, se puede reducir la dosis/frecuencia de dosificación. La pralidoxima es un componente esencial del tratamiento de la toxicidad por insecticidas organofosforados y agentes nerviosos; consultar la monografía de pralidoxima para conocer la vía y la dosis específicas.

IV:

Síntomas leves a moderados: Inicial: bolo de 1 a 2 mg (Ref); repetir duplicando la dosis cada 3 a 5 minutos si la dosis anterior no indujo una respuesta (Ref). Mantener la atropinización administrando dosis repetidas según sea necesario durante ≥2 a 12 horas según la recurrencia de los síntomas (Ref). Después de lograr la respuesta deseada con la

dosificación en bolo, considere iniciar una infusión intravenosa continua para mejorar los resultados clínicos (Ref).

Síntomas graves: Inicial: bolo de 3 a 5 mg (Ref); repetir duplicando la dosis cada 3 a 5 minutos si la dosis anterior no indujo una respuesta (Ref). Mantener la atropinización administrando dosis repetidas según sea necesario durante ≥2 a 12 horas según la recurrencia de los síntomas (Ref). Después de lograr la respuesta deseada con la dosificación en bolo, considere iniciar una infusión intravenosa continua para mejorar los resultados clínicos (Ref).

Infusión intravenosa continua: después de lograr la respuesta deseada con bolos intravenosos, administre entre el 10 % y el 20 % de la dosis total acumulada en bolo intravenoso como una infusión intravenosa continua por hora (p. ej., si se requieren 18 mg administrados en bolo intravenoso para lograr la respuesta deseada, inicie una infusión intravenosa continua de 1,8 mg por hora); ajuste la velocidad de infusión según sea necesario para mantener una respuesta adecuada sin causar toxicidad por atropina (Ref).

Intramuscular (AtroPen):

Síntomas leves (≥2 síntomas leves): administrar 2 mg tan pronto como se conozca o se sospeche firmemente que se ha producido una exposición. Si aparecen síntomas graves después de la primera dosis, se deben repetir 2 dosis adicionales en rápida sucesión 10 minutos después de la primera dosis; no administrar más de 3 dosis. Si se producen efectos anticolinérgicos profundos en ausencia de secreciones bronquiales excesivas, se deben suspender las dosis adicionales de atropina.

Síntomas graves (≥1 síntoma grave): Administrar inmediatamente **tres** dosis de 2 mg en rápida sucesión.

Síntomas de intoxicación por insecticidas o agentes nerviosos, según lo indicado por el fabricante en la etiqueta del producto AtroPen, para guiar la terapia:

Mild symptoms: Blurred vision, bradycardia, breathing difficulties, chest tightness, coughing, drooling, miosis, muscular twitching, nausea, runny nose, salivation increased, stomach cramps, tachycardia, teary eyes, tremor, vomiting, or wheezing.

Severe symptoms: Breathing difficulties (severe), confused/strange behavior, defecation (involuntary), muscular twitching/generalized weakness (severe), respiratory secretions (severe), seizure, unconsciousness, urination (involuntary).

Endotracheal: Usual dose: 2 to 2.5 times IV dose diluted in 5 to 10 mL of 0.9% sodium chloride or sterile water (Ref).

Stress echocardiography

Stress echocardiography (adjunctive agent) (diagnostic agent) (off-label use): IV: 0.25 to 0.5 mg every 1 minute as needed until 85% of age-predicted maximum heart rate is achieved; maximum total dose: 1 to 2 mg (Ref).

Dosage adjustment for concomitant therapy: Significant drug interactions exist, requiring dose/frequency adjustment or avoidance. Consult drug interactions database for more information.

Dosing: Kidney Impairment: Adult

There are no dosage adjustments provided in the manufacturer's labeling (has not been studied).

Dosing: Liver Impairment: Adult

There are no dosage adjustments provided in the manufacturer's labeling (has not been studied).

Dosing: Older Adult

Refer to adult dosing.

Dosing: Pediatric

(For additional information see "Atropine (systemic): Pediatric drug information")

Collapse All

Bradycardia

Bradycardia:

Infants, Children, and Adolescents:

IV, Intraosseous: 0.02 mg/kg/dose; minimum dose: 0.1 mg/dose, maximum dose: 0.5 mg/dose; may repeat once in 5 minutes; reserve use for those patients unresponsive to improved oxygenation and epinephrine (Ref); some have suggested the minimum dose should not be used in patients <5 kg (Ref).

Endotracheal: 0.04 to 0.06 mg/kg/dose; may repeat once if needed (Ref).

Inhibit salivation and secretions

Inhibit salivation and secretions (preoperative/intraoperative):

Infants and Children <12 years: IM, IV, SUBQ: 0.02 mg/kg/dose; maximum dose: 0.5 mg/dose; administer first dose 30 to 60 minutes preoperatively and then repeat every 4 to 6 hours as needed; maximum **total** dose: 1 mg/procedure.

Children ≥12 years and Adolescents: IM, IV, SUBQ: 0.02 mg/kg/dose; maximum dose: 1 mg/dose; administer first dose 30 to 60 minutes preoperatively and then repeat every 4 to 6 hours as needed; maximum **total** dose: 2 mg/procedure.

Intubation; emergent

Intubation; emergent (premedication): Note: Routine use not recommended for preintubation in infants and children; atropine may be considered in situations with a high-risk of bradycardia (eg, succinylcholine use) (Ref) or septic shock (Ref).

Infants and Children: IV: 0.02 mg/kg/dose with no minimum dose; maximum dose: 0.5 mg/dose (Ref).

Muscarine-containing mushroom poisoning

Muscarine-containing mushroom poisoning: Limited data available: Infants, Children, and Adolescents: IV: 0.02 mg/kg/dose; minimum dose: 0.1 mg. Titrate and repeat as needed to reverse symptoms (ie, titrate to achieve decreased bronchial secretions) (Ref).

Organophosphate or carbamate insecticide or nerve agent poisoning

Organophosphate or carbamate insecticide or nerve agent poisoning:

Note: If exposure is known or suspected, antidotal therapy should be given as soon as symptoms appear; do not wait for confirmation. The dose of atropine required varies considerably with the severity of poisoning. The total amount of atropine used for carbamate poisoning is usually less than with organophosphate insecticide or nerve agent poisoning. Severely poisoned patients may exhibit significant tolerance to atropine; ≥2 times the suggested

doses may be needed. Titrate to pulmonary status (decreased bronchial secretions); consider administration of atropine via continuous IV infusion in patients requiring large doses of atropine (Ref). Once patient is stable for a period of time, the dose/dosing frequency may be decreased. Pralidoxime is a component of the management of organophosphate insecticide and nerve agent toxicity; refer to pralidoxime for the specific route and dose.

IV, IM, Intraosseous (Ref):

Infants and Children: Initial: 0.05 to 0.1 mg/kg; repeat every 3 to 5 minutes as needed, double the dose if previous dose does not induce atropinization (Ref). Maintain atropinization by administering repeat doses as needed for ≥2 to 12 hours based on recurrence of symptoms (Ref).

Adolescents: Initial: 1 to 3 mg; repeat every 3 to 5 minutes as needed, doubling the dose if previous dose does not induce atropinization. Maintain atropinization by administering repeat doses as needed for ≥2 to 12 hours based on recurrence of symptoms (Ref).

Continuous IV infusion: Infants, Children, and Adolescents: Following atropinization, administer 10% to 20% of the total loading dose required to induce atropinization as a continuous IV infusion per hour; adjust as needed to maintain adequate atropinization without atropine toxicity (Ref).

IM (AtroPen): Infants, Children, and Adolescents: Number of doses dependent upon symptom severity:

Weight-directed dosing:

<7 kg (<15 lb): 0.25 mg/dose (yellow pen).

7 to 18 kg (15 to 40 lb): 0.5 mg/dose (blue pen).

>18 to 41 kg (>40 to 90 lb): 1 mg/dose (dark red pen).

>41 kg (>90 lb): 2 mg/dose (green pen).

Mild symptoms (≥2 mild symptoms): Administer the weight-directed dose listed above as soon as an exposure is known or strongly suspected. If severe symptoms develop after the first dose, 2 additional doses should be repeated in rapid succession 10 minutes after the first dose; do not administer more than 3 doses. If profound anticholinergic effects occur in the absence of excessive bronchial secretions, further doses of atropine should be withheld. Mild symptoms of insecticide or nerve agent poisoning, as provided by

manufacturer in the AtroPen product labeling to guide therapy, include: Blurred vision, bradycardia, breathing difficulties, chest tightness, coughing, drooling, miosis, muscular twitching, nausea, runny nose, salivation increased, stomach cramps, tachycardia, teary eyes, tremor, vomiting, or wheezing.

Severe symptoms (≥1 severe symptom): Immediately administer **three** weight-directed doses in rapid succession (Ref). Severe symptoms of insecticide or nerve agent poisoning, as provided by manufacturer in the AtroPen product labeling to guide therapy, include: Breathing difficulties (severe), confused/strange behavior, defecation (involuntary), muscular twitching/generalized weakness (severe), respiratory secretions (severe), seizure, unconsciousness, urination (involuntary); **Note:** Infants may become drowsy or unconscious with muscle floppiness as opposed to muscle twitching.

Endotracheal: Infants, Children, and Adolescents: Increase the dose by 2 to 3 times the usual IV dose. Mix with 3 to 5 mL of normal saline and administer. Flush with 3 to 5 mL of NS and follow with 5 assisted manual ventilations (Ref).

Dosage adjustment for concomitant therapy: Significant drug interactions exist, requiring dose/frequency adjustment or avoidance. Consult drug interactions database for more information.

Dosing: Kidney Impairment: Pediatric

There are no dosage adjustments provided in the manufacturer's labeling.

Dosing: Liver Impairment: Pediatric

There are no dosage adjustments provided in the manufacturer's labeling.

Adverse Reactions

The following adverse drug reactions and incidences are derived from product labeling unless otherwise specified. Frequency not always defined. Severity and frequency of adverse reactions are dose related.

Cardiovascular: Asystole, atrial arrhythmia, atrial fibrillation, atrioventricular dissociation (transient), bigeminy, bradycardia, chest pain, decreased blood pressure, ECG changes (prolonged P wave, shortened PR segment, R on T phenomenon, shortened RT duration, prolonged QT interval, widening of QRS Complex, flattened T wave, repolarization abnormalities, ST segment elevation, retrograde conduction), ectopic beats (atrial), extrasystoles (nodal, ventricular, supraventricular), flushing, increased blood pressure, left heart failure, myocardial infarction, nodal arrhythmia (no P wave on ECG),

palpitations, sinus tachycardia, supraventricular tachycardia (including junctional tachycardia), tachycardia, trigeminy, ventricular arrhythmia (including flutter), ventricular fibrillation, ventricular flutter, ventricular premature contractions, ventricular tachycardia, weak pulse (or impalpable peripheral pulses)

Central nervous system: Abnormal electroencephalogram (runs of alpha waves, increase in photic stimulation, and signs of drowsiness), agitation (children), amnesia, anxiety, ataxia, behavioral changes, coma, confusion, decreased deep tendon reflex, delirium, dizziness, drowsiness, dysarthria, dysmetria, emotional disturbance, excitement, feeling hot, hallucination (visual or aural), headache, hyperpyrexia, hyperreflexia, hypertonia, insomnia, intoxicated feeling, irritability (children), lack of concentration, lethargy (children), mania, myoclonus, neurologic abnormality, nocturnal enuresis, opisthotonus, paranoia, positive Babinski sign, restlessness, seizure (generally tonic-clonic), stupor, vertigo

Dermatologic: Anhidrosis, cold skin, dermatitis, dry and hot skin, erythematous rash, hyperhidrosis, macular eruption, maculopapular rash, papular rash, scarlatiniform rash, skin rash

Endocrine & metabolic: Dehydration, hyperglycemia, hypoglycemia, hypokalemia, hyponatremia, increased thirst, loss of libido

Gastrointestinal: Abdominal and bladder distension, abdominal pain, constipation, delayed gastric emptying, diminished bowel sounds, dry mucous membranes, dysphagia, malabsorption, nausea, oral lesion, paralytic ileus, salivation, vomiting, xerostomia

Genitourinary: Difficulty in micturition, impotence, urinary hesitancy, urinary retention, urinary urgency

Hematologic & oncologic: Abnormal erythrocytes (increased), decreased hemoglobin, increased hemoglobin, leukocytosis, petechiae

Hypersensitivity: Hypersensitivity reaction

Local: Injection site reaction

Neuromuscular & skeletal: Laryngospasm, muscle twitching, weakness

Ophthalmic: Abnormal eye movements (cyclophoria and heterophoria), angle-closure glaucoma (acute), blepharitis, blindness, blurred vision, conjunctivitis, crusted of eyelid, cycloplegia, decreased accommodation, decreased visual acuity, dry eye syndrome, eye irritation, lacrimation, mydriasis, photophobia, strabismus

Renal: Increased blood urea nitrogen

Respiratory: Bradypnea, changes in respiration (labored respiration), cyanosis, dyspnea, laryngitis, pulmonary edema, respiratory failure, stridor (inspiratory), tachypnea

Miscellaneous: Failure to thrive, fever (secondary to decreased sweat gland activity), swelling (children)

Contraindications

There are no contraindications listed in the manufacturer's US labeling.

Canadian labeling: Hypersensitivity to atropine or any component of the formulation; GI obstruction, glaucoma (known or suspected), pyloric stenosis or prostatic hypertrophy (except in doses typically used for preanesthesia).

Warnings/Precautions

Concerns related to adverse effects:

- Hypersensitivity: Hypersensitivity reactions, including anaphylactic reactions, may occur.
- Hyperthermia: Atropine may inhibit sweating and possibly lead to heat-related injury or hyperthermia in patients exposed to warm environments or exercise.
- Psychosis: Can occur in sensitive individuals or following use of excessive doses.

Disease-related concerns:

- Arrhythmias: Avoid relying on atropine for effective treatment of type II second-degree or third-degree AV block (with or without a new wide QRS complex). Asystole or bradycardic PEA: Although no evidence exists for significant detrimental effects, routine use is unlikely to have a therapeutic benefit and is no longer recommended (ACLS 2010).
- Cardiovascular disease: Use with caution in patients with myocardial ischemia, heart failure, tachyarrhythmias (including sinus tachycardia), and/or hypertension; treatment-related blood pressure increases and tachycardia may lead to ischemia, precipitate an MI, or increase arrhythmogenic potential.
- Chronic lung disease: Use with caution in patients with chronic lung disease; may cause thickening of bronchial secretions and formation of dangerous viscid plugs.
- Glaucoma: Use with caution in patients with severe narrow-angle glaucoma; may precipitate acute glaucoma.
- Hepatic impairment: Use with caution in patients with hepatic impairment; effects of atropine may be prolonged in severe hepatic impairment.

- Hiatal hernia: Use with caution in patients with hiatal hernia associated with reflux esophagitis.
- Hyperthyroidism: Use with caution in patients with hyperthyroidism.
- Myasthenia gravis: Use with extreme caution when used to treat side effects of acetylcholinesterase inhibition or avoid; may precipitate a myasthenic crisis.
- Neuropathy: Use with caution in patients with autonomic neuropathy.
- Pyloric stenosis: Use with caution in patients with partial pyloric stenosis; may cause complete pyloric obstruction.
- Renal impairment: Use with caution in patients with renal impairment; effects of atropine may be prolonged in severe renal impairment.
- Urinary retention: Use with caution in patients with urinary obstruction; may cause urinary retention.

Special populations:

- Heart transplant recipients: Atropine will likely be ineffective in treatment of bradycardia due to lack of vagal innervation of the transplanted heart. Cholinergic reinnervation may occur over time (years), so atropine may be used cautiously; however, some may experience paradoxical slowing of the heart rate and high-degree AV block upon administration (ACLS 2010; Bernheim 2004).
- Pediatric: Children may be more sensitive to the anticholinergic effects of atropine. Use with caution in children with spastic paralysis.

Dosage form specific issues:

- Benzyl alcohol and derivatives: Some dosage forms may contain benzyl alcohol and/or sodium benzoate/benzoic acid; benzoic acid (benzoate) is a metabolite of benzyl alcohol; large amounts of benzyl alcohol (≥99 mg/kg/day) have been associated with a potentially fatal toxicity (“gasping syndrome”) in neonates; the “gasping syndrome” consists of metabolic acidosis, respiratory distress, gasping respirations, CNS dysfunction (including convulsions, intracranial hemorrhage), hypotension, and cardiovascular collapse (AAP ["Inactive" 1997]; CDC 1982); some data suggest that benzoate displaces bilirubin from protein binding sites (Ahlfors 2001); avoid or use dosage forms containing benzyl alcohol and/or benzyl alcohol derivative with caution in neonates. See manufacturer's labeling.

Other warnings/precautions:

- Appropriate use: Anticholinesterase poisoning: Atropine reverses the muscarinic but not the nicotinic effects associated with anticholinesterase toxicity. Clinical symptoms consistent with highly-suspected organophosphate or carbamate insecticides or nerve agent poisoning should be treated with antidote immediately; administration should not be delayed for confirmatory laboratory tests. Signs of atropinization include flushing, mydriasis, tachycardia, and dryness of the mouth or nose. Monitor effects closely when administering subsequent injections as necessary. The presence of these effects is not indicative of the success of therapy; inappropriate use of mydriasis as an indicator of successful treatment has resulted in atropine toxicity. Reversal of bronchial secretions is the preferred indicator of success. Adjunct treatment with a cholinesterase reactivator (eg, pralidoxime) may be required in patients with toxicity secondary to organophosphorus insecticides or nerve agents. Treatment should always include proper evacuation and decontamination procedures; medical personnel should protect themselves from inadvertent contamination. Antidotal administration is intended only for initial management; definitive and more extensive medical care is required following administration. Individuals should not rely solely on antidote for treatment, as other supportive measures (eg, artificial respiration) may still be required.

Warnings: Additional Pediatric Considerations

Several reports in the literature have described neonates developing central anticholinergic syndrome after receiving atropine for bradycardia at doses of 0.1 mg, the minimum dose that has been described for preventing paradoxical bradycardia. When evaluated based on weight, this dose exceeded 0.02 mg/kg in all cases (Gillick 1974; Prakash 2017; Rizzi 2004); some literature has recommended against using a minimum dose in patients <5 kg to prevent overdose (Barrington 2011; Prakash 2017).

Dosage Forms: US

Excipient information presented when available (limited, particularly for generics); consult specific product labeling. [DSC] = Discontinued product

Solution, Injection, as sulfate:

Generic: 8 mg/20 mL (20 mL)

Solution, Injection, as sulfate [preservative free]:

Generic: 0.4 mg/mL (1 mL [DSC]); 1 mg/mL (1 mL [DSC])

Solution, Intravenous, as sulfate [preservative free]:

Generic: 0.4 mg/mL (1 mL); 1 mg/mL (1 mL)

Solution Auto-injector, Intramuscular, as sulfate:

AtroPen: 0.5 mg/0.7 mL (0.7 mL [DSC]); 1 mg/0.7 mL (0.7 mL [DSC]); 2 mg/0.7 mL (0.7 mL [DSC]) [pyrogen free; contains phenol]

Solution Auto-injector, Intramuscular, as sulfate [preservative free]:

AtroPen: 0.25 mg/0.3 mL (0.3 mL [DSC]) [pyrogen free]

Solution Prefilled Syringe, Injection, as sulfate:

Generic: 1 mg/10 mL (10 mL)

Solution Prefilled Syringe, Injection, as sulfate [preservative free]:

Generic: 0.25 mg/5 mL (5 mL); 0.5 mg/5 mL (5 mL); 1 mg/10 mL (10 mL)

Generic Equivalent Available: US

May be product dependent

Pricing: US

Solution (Atropine Sulfate Injection)

8 mg/20 mL (per mL): $2.11 - $4.20

Solution (Atropine Sulfate Intravenous)

0.4 mg/mL (per mL): $13.48 - $14.50

1 mg/mL (per mL): $20.35 - $22.61

Solution Prefilled Syringe (Atropine Sulfate Injection)

0.25 mg/5 mL (per mL): $5.92

0.5 mg/5 mL (per mL): $2.29 - $3.87

1 mg/10 mL (per mL): $1.20 - $2.22

Disclaimer: A representative AWP (Average Wholesale Price) price or price range is provided as reference price only. A range is provided when more than one manufacturer's AWP price is available and uses the low and high price reported by the manufacturers to determine the range. The pricing data should be used for benchmarking purposes only, and as such should not be used alone to set or adjudicate any prices for reimbursement or purchasing functions or considered to be an exact price for a single product and/or manufacturer. Medi-Span expressly disclaims all warranties of any kind or nature, whether express or implied, and assumes no liability with respect to accuracy of price or price range data published in its solutions. In no event shall Medi-Span be liable for special, indirect, incidental, or

consequential damages arising from use of price or price range data. Pricing data is updated monthly.

Dosage Forms: Canada

Excipient information presented when available (limited, particularly for generics); consult specific product labeling. [DSC] = Discontinued product

Solution, Injection:

Generic: 0.6 mg/mL (1 mL)

Solution, Injection, as sulfate:

Generic: 0.1 mg/mL (10 mL); 0.4 mg/mL (1 mL, 10 mL)

Solution Prefilled Syringe, Injection:

Generic: 0.5 mg/5 mL (5 mL); 1 mg/5 mL (5 mL)

Solution Prefilled Syringe, Injection, as sulfate:

Generic: 0.5 mg/5 mL ([DSC])

Prescribing and Access Restrictions

The AtroPen formulation is available for use primarily by the Department of Defense.

Administration: Adult

IM: AtroPen: Administer to the outer thigh. Firmly grasp the autoinjector with the green tip (0.5 mg, 1 mg, and 2 mg autoinjector) or black tip (0.25 mg autoinjector) pointed down; remove the yellow safety release (0.5 mg, 1 mg, and 2 mg autoinjector) or gray safety release (0.25 autoinjector). Jab the green tip at a 90° angle against the outer thigh; may be administered through clothing as long as pockets at the injection site are empty. In thin patients, bunch up the thigh prior to injection. Hold the autoinjector in place for 10 seconds following the injection; remove the autoinjector and massage the injection site. After administration, the needle will be visible; if the needle is not visible, repeat the above steps. After use, bend the needle against a hard surface (needle does not retract) to avoid accidental injury.

IV: Administer undiluted by rapid IV injection; slow injection may result in paradoxical bradycardia. In bradycardia, atropine administration should not delay treatment with external pacing.

Intraosseous (IO): May administer intraosseous if needed.

Endotracheal: Dilute in ≤10 mL NS or sterile water. Absorption may be greater with sterile water. Stop compressions (if using for cardiac arrest), spray the drug quickly down the tube. Follow immediately with several quick insufflations and continue chest compressions.

SUBQ: May administer subcutaneous if needed.

Administration: Pediatric

Endotracheal: May administer dose undiluted, followed by flush with 1 to 5 mL of NS after endotracheal administration or may further dilute in NS or sterile water prior to administration (ie, 1 to 2 mg in ≤10 mL of NS or sterile water); follow with 5 assisted manual ventilations (Ref). If using for cardiac arrest, stop compressions during drug administration and resume chest compressions following manual ventilation.

Flush volume based on indication:

Bradycardia:

Neonates: Flush with ≥1 mL NS (Ref).

Infants, Children, and Adolescents: Flush with 5 mL NS (Ref).

Organophosphate or carbamate insecticide or nerve agent poisoning: Flush with 3 to 5 mL NS (Ref).

Parenteral:

IV: Administer undiluted by rapid IV injection; slow injection may result in paradoxical bradycardia.

IM: AtroPen: Administer to the outer thigh. Firmly grasp the autoinjector with the green tip (0.5 mg, 1 mg, and 2 mg autoinjector) or black tip (0.25 mg autoinjector) pointed down; remove the yellow safety release (0.5 mg, 1 mg, and 2 mg autoinjector) or gray safety release (0.25 autoinjector). Firmly jab the green tip at a 90° angle against the outer thigh; may be administered through clothing as long as pockets at the injection site are empty. In thin patients or patients <6.8 kg (15 lb), bunch up the thigh prior to injection. Hold the autoinjector in place for 10 seconds following the injection; remove the autoinjector and massage the injection site. After administration, the needle will be visible; if the needle is not visible, repeat the above steps with more pressure. After use, bend the needle against a hard surface (needle does not retract) to avoid accidental injury.

Use: Labeled Indications

Bradycardia during neuromuscular blockade reversal: Adjuvant use during neuromuscular blockade reversal with anticholinesterases (eg, edrophonium, neostigmine) to manage bradycardia.

Bradycardia, symptomatic: Treatment of symptomatic sinus bradycardia.

Inhibition of salivation and secretions (preanesthesia): Preoperative/preanesthetic medication to inhibit salivation and secretions.

Muscarine-containing mushroom poisoning: Treatment of symptoms from muscarine-containing mushroom poisoning.

Organophosphate or carbamate insecticide or nerve agent poisoning: Antidote for anticholinesterase poisoning (carbamate insecticides, nerve agents, organophosphate insecticides).

Use: Off-Label: Adult

Stress echocardiography (adjunctive agent) (diagnostic agent)

Medication Safety Issues

Older Adult: High-Risk Medication:

Beers Criteria: Atropine is identified in the Beers Criteria as a potentially inappropriate medication to be avoided in patients 65 years and older (independent of diagnosis or condition) due to its highly anticholinergic properties and uncertain effectiveness as an antispasmodic (Beers Criteria [AGS 2023]).

Metabolism/Transport Effects

None known.

Drug Interactions

(For additional information: Launch drug interactions program)

Note: Interacting drugs may **not be individually listed below** if they are part of a group interaction (eg, individual drugs within “CYP3A4 Inducers [Strong]” are NOT listed). For a complete list of drug interactions by individual drug name and detailed management recommendations, use the drug interactions program by clicking on the “Launch drug interactions program” link above.

Acetylcholinesterase Inhibitors: May diminish the therapeutic effect of Agents with Clinically Relevant Anticholinergic Effects. Agents with Clinically Relevant Anticholinergic Effects may diminish the therapeutic effect of Acetylcholinesterase Inhibitors. *Risk C: Monitor therapy*

Aclidinium: May enhance the anticholinergic effect of Agents with Clinically Relevant Anticholinergic Effects. *Risk X: Avoid combination*

Alpha1-Agonists: Atropine (Systemic) may enhance the hypertensive effect of Alpha1-Agonists. *Risk C: Monitor therapy*

Amantadine: May enhance the anticholinergic effect of Agents with Clinically Relevant Anticholinergic Effects. *Risk C: Monitor therapy*

Amezinium: Atropine (Systemic) may enhance the stimulatory effect of Amezinium. *Risk C: Monitor therapy*

Benperidol: Agents with Clinically Relevant Anticholinergic Effects may diminish the therapeutic effect of Benperidol. *Risk C: Monitor therapy*

Benztropine: Agents with Clinically Relevant Anticholinergic Effects may enhance the anticholinergic effect of Benztropine. *Risk C: Monitor therapy*

Beta-Acetyldigoxin: Atropine (Systemic) may increase the serum concentration of Beta-Acetyldigoxin. *Risk C: Monitor therapy*

Biperiden: Agents with Clinically Relevant Anticholinergic Effects may enhance the anticholinergic effect of Biperiden. *Risk C: Monitor therapy*

Bornaprine: Agents with Clinically Relevant Anticholinergic Effects may enhance the anticholinergic effect of Bornaprine. *Risk C: Monitor therapy*

Botulinum Toxin-Containing Products: May enhance the anticholinergic effect of Agents with Clinically Relevant Anticholinergic Effects. *Risk C: Monitor therapy*

Bromperidol: Agents with Clinically Relevant Anticholinergic Effects may enhance the anticholinergic effect of Bromperidol. *Risk C: Monitor therapy*

Buclizine: Agents with Clinically Relevant Anticholinergic Effects may enhance the anticholinergic effect of Buclizine. *Risk C: Monitor therapy*

Cannabinoid-Containing Products: Agents with Clinically Relevant Anticholinergic Effects may enhance the tachycardic effect of Cannabinoid-Containing Products. *Risk C: Monitor therapy*

Chloral Betaine: May enhance the adverse/toxic effect of Agents with Clinically Relevant Anticholinergic Effects. *Risk C: Monitor therapy*

Chlorprothixene: Agents with Clinically Relevant Anticholinergic Effects may enhance the anticholinergic effect of Chlorprothixene. *Risk C: Monitor therapy*

Cimetropium: Agents with Clinically Relevant Anticholinergic Effects may enhance the anticholinergic effect of Cimetropium. *Risk X: Avoid combination*

CloZAPine: Agents with Clinically Relevant Anticholinergic Effects may enhance the constipating effect of CloZAPine. Management: Consider alternatives to this combination whenever possible. If combined, monitor closely for signs and symptoms of gastrointestinal hypomotility and consider prophylactic laxative treatment. *Risk D: Consider therapy modification*

Cyclizine: May enhance the anticholinergic effect of Agents with Clinically Relevant Anticholinergic Effects. *Risk C: Monitor therapy*

Darifenacin: Agents with Clinically Relevant Anticholinergic Effects may enhance the anticholinergic effect of Darifenacin. *Risk C: Monitor therapy*

Dicyclomine: Agents with Clinically Relevant Anticholinergic Effects may enhance the anticholinergic effect of Dicyclomine. *Risk C: Monitor therapy*

Dimethindene (Systemic): Agents with Clinically Relevant Anticholinergic Effects may enhance the anticholinergic effect of Dimethindene (Systemic). *Risk C: Monitor therapy*

DroNABinol: Agents with Clinically Relevant Anticholinergic Effects may enhance the tachycardic effect of DroNABinol. *Risk X: Avoid combination*

Eluxadoline: Agents with Clinically Relevant Anticholinergic Effects may enhance the constipating effect of Eluxadoline. *Risk X: Avoid combination*

EPHEDrine (Systemic): Atropine (Systemic) may enhance the therapeutic effect of EPHEDrine (Systemic). *Risk C: Monitor therapy*

Fesoterodine: Agents with Clinically Relevant Anticholinergic Effects may enhance the anticholinergic effect of Fesoterodine. *Risk C: Monitor therapy*

FluPHENAZine: May enhance the anticholinergic effect of Agents with Clinically Relevant Anticholinergic Effects. *Risk C: Monitor therapy*

Gastrointestinal Agents (Prokinetic): Agents with Clinically Relevant Anticholinergic Effects may diminish the therapeutic effect of Gastrointestinal Agents (Prokinetic). *Risk C: Monitor therapy*

Glucagon: Agents with Clinically Relevant Anticholinergic Effects may enhance the adverse/toxic effect of Glucagon. Specifically, the risk of gastrointestinal adverse effects may be increased. *Risk C: Monitor therapy*

Glycopyrrolate (Oral Inhalation): Agents with Clinically Relevant Anticholinergic Effects may enhance the anticholinergic effect of Glycopyrrolate (Oral Inhalation). *Risk X: Avoid combination*

Glycopyrrolate (Systemic): Agents with Clinically Relevant Anticholinergic Effects may enhance the anticholinergic effect of Glycopyrrolate (Systemic). *Risk C: Monitor therapy*

Glycopyrronium (Topical): May enhance the anticholinergic effect of Agents with Clinically Relevant Anticholinergic Effects. *Risk X: Avoid combination*

Ipratropium (Nasal): May enhance the anticholinergic effect of Agents with Clinically Relevant Anticholinergic Effects. *Risk C: Monitor therapy*

Ipratropium (Oral Inhalation): May enhance the anticholinergic effect of Agents with Clinically Relevant Anticholinergic Effects. *Risk X: Avoid combination*

Itopride: Agents with Clinically Relevant Anticholinergic Effects may diminish the therapeutic effect of Itopride. *Risk C: Monitor therapy*

Levosulpiride: Agents with Clinically Relevant Anticholinergic Effects may diminish the therapeutic effect of Levosulpiride. *Risk X: Avoid combination*

Macimorelin: Atropine (Systemic) may diminish the diagnostic effect of Macimorelin. *Risk X: Avoid combination*

Maprotiline: Agents with Clinically Relevant Anticholinergic Effects may enhance the anticholinergic effect of Maprotiline. *Risk C: Monitor therapy*

Melperone: May enhance the anticholinergic effect of Agents with Clinically Relevant Anticholinergic Effects. *Risk C: Monitor therapy*

Methotrimeprazine: Agents with Clinically Relevant Anticholinergic Effects may enhance the anticholinergic effect of Methotrimeprazine. *Risk C: Monitor therapy*

Methscopolamine: Agents with Clinically Relevant Anticholinergic Effects may enhance the anticholinergic effect of Methscopolamine. *Risk C: Monitor therapy*

Mirabegron: Agents with Clinically Relevant Anticholinergic Effects may enhance the adverse/toxic effect of Mirabegron. *Risk C: Monitor therapy*

Nitroglycerin: Agents with Clinically Relevant Anticholinergic Effects may decrease the absorption of Nitroglycerin. Specifically, anticholinergic agents may decrease the

dissolution of sublingual nitroglycerin tablets, possibly impairing or slowing nitroglycerin absorption. *Risk C: Monitor therapy*

OLANZapine: Agents with Clinically Relevant Anticholinergic Effects may enhance the anticholinergic effect of OLANZapine. *Risk C: Monitor therapy*

Opioid Agonists: Agents with Clinically Relevant Anticholinergic Effects may enhance the adverse/toxic effect of Opioid Agonists. Specifically, the risk for constipation and urinary retention may be increased with this combination. *Risk C: Monitor therapy*

Oxatomide: May enhance the anticholinergic effect of Agents with Clinically Relevant Anticholinergic Effects. *Risk X: Avoid combination*

OxyBUTYnin: Agents with Clinically Relevant Anticholinergic Effects may enhance the anticholinergic effect of OxyBUTYnin. *Risk C: Monitor therapy*

Perazine: May enhance the anticholinergic effect of Agents with Clinically Relevant Anticholinergic Effects. *Risk C: Monitor therapy*

Perphenazine: Agents with Clinically Relevant Anticholinergic Effects may enhance the anticholinergic effect of Perphenazine. *Risk C: Monitor therapy*

Potassium Chloride: Agents with Clinically Relevant Anticholinergic Effects may enhance the ulcerogenic effect of Potassium Chloride. Management: Patients on drugs with substantial anticholinergic effects should avoid using any solid oral dosage form of potassium chloride. *Risk X: Avoid combination*

Potassium Citrate: Agents with Clinically Relevant Anticholinergic Effects may enhance the ulcerogenic effect of Potassium Citrate. Management: Patients on drugs with substantial anticholinergic effects should avoid using any solid oral dosage form of potassium citrate. *Risk X: Avoid combination*

Pramlintide: May enhance the anticholinergic effect of Agents with Clinically Relevant Anticholinergic Effects. These effects are specific to the GI tract. *Risk X: Avoid combination*

Promethazine: Agents with Clinically Relevant Anticholinergic Effects may enhance the anticholinergic effect of Promethazine. *Risk C: Monitor therapy*

Propantheline: Agents with Clinically Relevant Anticholinergic Effects may enhance the anticholinergic effect of Propantheline. *Risk C: Monitor therapy*

Propiverine: May enhance the anticholinergic effect of Agents with Clinically Relevant Anticholinergic Effects. *Risk C: Monitor therapy*

QuiNIDine: May enhance the anticholinergic effect of Agents with Clinically Relevant Anticholinergic Effects. *Risk C: Monitor therapy*

Ramosetron: Agents with Clinically Relevant Anticholinergic Effects may enhance the constipating effect of Ramosetron. *Risk C: Monitor therapy*

Revefenacin: Agents with Clinically Relevant Anticholinergic Effects may enhance the anticholinergic effect of Revefenacin. *Risk X: Avoid combination*

Ritodrine: Atropine (Systemic) may enhance the adverse/toxic effect of Ritodrine. *Risk C: Monitor therapy*

Rivastigmine: Agents with Clinically Relevant Anticholinergic Effects may diminish the therapeutic effect of Rivastigmine. Rivastigmine may diminish the therapeutic effect of Agents with Clinically Relevant Anticholinergic Effects. Management: Use of rivastigmine with an anticholinergic agent is not recommended unless clinically necessary. If the combination is necessary, monitor for reduced anticholinergic effects. *Risk D: Consider therapy modification*

Scopolamine: Agents with Clinically Relevant Anticholinergic Effects may enhance the anticholinergic effect of Scopolamine. *Risk C: Monitor therapy*

Secretin: Agents with Clinically Relevant Anticholinergic Effects may diminish the therapeutic effect of Secretin. Management: Avoid concomitant use of anticholinergic agents and secretin. Discontinue anticholinergic agents at least 5 half-lives prior to administration of secretin. *Risk D: Consider therapy modification*

Sincalide: Drugs that Affect Gallbladder Function may diminish the therapeutic effect of Sincalide. Management: Consider discontinuing drugs that may affect gallbladder motility prior to the use of sincalide to stimulate gallbladder contraction. *Risk D: Consider therapy modification*

Sofpironium: Agents with Clinically Relevant Anticholinergic Effects may enhance the anticholinergic effect of Sofpironium. *Risk X: Avoid combination*

Thiazide and Thiazide-Like Diuretics: Agents with Clinically Relevant Anticholinergic Effects may increase the serum concentration of Thiazide and Thiazide-Like Diuretics. *Risk C: Monitor therapy*

Thiothixene: Agents with Clinically Relevant Anticholinergic Effects may enhance the anticholinergic effect of Thiothixene. *Risk C: Monitor therapy*

Tiotropium: Agents with Clinically Relevant Anticholinergic Effects may enhance the anticholinergic effect of Tiotropium. *Risk X: Avoid combination*

Tolterodine: Agents with Clinically Relevant Anticholinergic Effects may enhance the anticholinergic effect of Tolterodine. *Risk C: Monitor therapy*

Topiramate: Agents with Clinically Relevant Anticholinergic Effects may enhance the adverse/toxic effect of Topiramate. *Risk C: Monitor therapy*

Tricyclic Antidepressants: Agents with Clinically Relevant Anticholinergic Effects may enhance the anticholinergic effect of Tricyclic Antidepressants. *Risk C: Monitor therapy*

Trimethobenzamide: Agents with Clinically Relevant Anticholinergic Effects may enhance the anticholinergic effect of Trimethobenzamide. *Risk C: Monitor therapy*

Trospium: Agents with Clinically Relevant Anticholinergic Effects may enhance the anticholinergic effect of Trospium. *Risk C: Monitor therapy*

Umeclidinium: May enhance the anticholinergic effect of Agents with Clinically Relevant Anticholinergic Effects. *Risk X: Avoid combination*

Zuclopenthixol: Agents with Clinically Relevant Anticholinergic Effects may enhance the anticholinergic effect of Zuclopenthixol. *Risk C: Monitor therapy*

Pregnancy Considerations

Atropine crosses the placenta.

In general, medications used as antidotes should take into consideration the health and prognosis of the mother; antidotes should be administered to pregnant women if there is a clear indication for use and should not be withheld because of fears of teratogenicity (Bailey 2003). Medications used for the treatment of cardiac arrest in pregnancy are the same as in the non-pregnant woman. Doses and indications should follow current Advanced Cardiovascular Life Support guidelines. Appropriate medications should not be withheld due to concerns of fetal teratogenicity (Jeejeebhoy [AHA] 2015).

Breastfeeding Considerations

Atropine is present in breast milk.

According to the manufacturer, the decision to breastfeed during therapy should consider the risk of infant exposure, the benefits of breastfeeding to the infant, and the benefits of treatment to the mother.

Monitoring Parameters

Heart rate, blood pressure, pulse, mental status; intravenous administration requires a cardiac monitor

Organophosphate or carbamate insecticide or nerve agent poisoning: Heart rate, blood pressure, respiratory status, oxygenation secretions. Maintain atropinization with repeated dosing as

indicated by clinical status. Crackles in lung bases, or continuation of cholinergic signs, may be signs of inadequate dosing. Pulmonary improvement may not parallel other signs of atropinization. Monitor for signs and symptoms of atropine toxicity (eg, fever, muscle fasciculations, delirium); if toxicity occurs, discontinue atropine and monitor closely.

Consult individual institutional policies and procedures.

Mechanism of Action

Blocks the action of acetylcholine at parasympathetic sites in smooth muscle, secretory glands, and the CNS; increases cardiac output, dries secretions. Atropine reverses the muscarinic effects of cholinergic poisoning due to agents with acetylcholinesterase inhibitor activity by acting as a competitive antagonist of acetylcholine at muscarinic receptors. The primary goal in cholinergic poisonings is reversal of bronchorrhea and bronchoconstriction. Atropine has no effect on the nicotinic receptors responsible for muscle weakness, fasciculations, and paralysis; concurrent administration of pralidoxime is necessary to reverse the nicotinic effects associated with organophosphate insecticide or nerve agent toxicity.

Pharmacokinetics (Adult Data Unless Noted)

Onset of action:

Inhibition of salivation: IM: Within 30 minutes; maximum effect: 30 to 60 minutes (Mirakhur 1980; Volz-Zang 1995)

Increased heart rate:

IM: Within 15 to 30 minutes (Kentala 1990; Volz-Zang 1995); maximum effect: 45 to 60 minutes (Mirakhur 1980; Volz-Zang 1995)

IV: Immediate; maximum effect: 0.7 to 4 minutes (Lonnerholm 1975; Santini 1999)

Duration: Inhibition of salivation: IM: ≤4 hours (Mirakhur 1980; Volz-Zang 1995)

Absorption: Rapid and well absorbed from all dosage forms

Distribution: Widely throughout the body; crosses blood-brain barrier

Protein binding: 14% to 44%

Metabolism: Hepatic via enzymatic hydrolysis

Half-life elimination: Children <2 years: 6.9 ± 3 hours; Children >2 years: 2.5 ± 1.2 hours; Adults: 3 ± 0.9 hours; Elderly 65 to 75 years of age: 10 ± 7.3 hours

Time to peak: IM: 30 minutes; IM autoinjector: 3 minutes

Excretion: Urine (13% to 50% as unchanged drug and metabolites)

Pharmacokinetics: Additional Considerations (Adult Data Unless Noted)

Older adult: Elimination half-life is more than doubled.

Sex: AUC and C_{max} are 15% higher in females than males; Elimination half-life is ~20 minutes shorter in females than males.

Brand Names: International

International Brand Names by Country

For country code abbreviations (show table)

(AR) Argentina: Endotropina | Sulfato de atropina Norgreen; (AT) Austria: Atropinsulfat Aguettant; (AU) Australia: Atropine sulphate; (BE) Belgium: Atropine sulfate aguettant; (BR) Brazil: Sulfato de atropina; (CH) Switzerland: Atropin sulfat | Atropin sulfat aguettant | Atropinium sulfuricum streuli; (CN) China: Atropine; (CZ) Czech Republic: Atropin | Atropine accord; (DE) Germany: Atropin accord | Dysurgal | Min-i-jet atropine; (ET) Ethiopia: Atropine sulphate; (FI) Finland: Atropin | Atropin aguettant | Atropin stragen | Atropine accord; (FR) France: Atropine sulfate aguettant; (GB) United Kingdom: Atropine sulphate; (HK) Hong Kong: Atropine; (HU) Hungary: Atropinum sulfuricum; (ID) Indonesia: Atropine; (IE) Ireland: Atropine sulfate aguettant | Atropine sulphate; (IL) Israel: Atropine; (IN) India: Atropine | Atropine sulphate | Atrothem; (IT) Italy: Atropina solfato laboratoire aguettant; (JP) Japan: Atquick | Atropine; (KE) Kenya: Atropine; (KR) Korea, Republic of: Sergal; (KW) Kuwait: Atropine sulfate aguettant; (LT) Lithuania: Atropin | Dysurgal; (LV) Latvia: Atropin; (MX) Mexico: Amixteria; (MY) Malaysia: Atropine sulphate; (NL) Netherlands: Atropine sulf | Atropinesulf | Atropinesulfaat Aguettant; (NO) Norway: Atropin | Atropin aguettant | Atropin stragen; (NZ) New Zealand: Atropine sulphate; (PK) Pakistan: Atroject | Atropine; (PL) Poland: Atropin; (PR) Puerto Rico: Sal-tropine; (PT) Portugal: Atropina accord | Atropina aguettant | Atropina Labesfal; (PY) Paraguay: Atropina sulfato lasca; (RO) Romania: Sulfat de atropina accord; (RU) Russian Federation: Atropin | Atropine nova; (SA) Saudi Arabia: Atropine sulphate; (SE) Sweden: Atropin stragen | Atropine accord; (SG) Singapore: Atropine | Atropine sulphate; (SI) Slovenia: Atropina solfato monico | Atropini sulfas; (SK) Slovakia: Atropin; (TH) Thailand: Atropine; (TW) Taiwan: Atropin sulfate | Atropine | Bellaton | Soreless | Spanton | Spasmatal; (UA) Ukraine: Atropin sulfate; (UG) Uganda: Atropine sulfate aguettant; (UY) Uruguay: Endotropina; (ZW) Zimbabwe: Atropine sulphate | Atropine sulphate fresenius | Pharma q atropine

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